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The Effect of the Color Mind Expression Program on the Psychological Mindedness of University Students

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색채마음표현 프로그램이 대학생의 심리적 마음상태에 미치는 효과

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Abstract In addition to education, the effects of color on humans have been studied in various areas such as human emotions, behaviors, and relationships between bodies. This study is based on the assumption that the color expression of University students can be observed to understand the inner and inclinations of University students, and that color expression activities can be a means of psychological expression, self-expression, and emotional relief. This study is aimed to find how much the color mind expression program effects the psychological mind state of University students. As a result of the study, the color mind expression program influenced the expression of inner feelings and emotions of University students, and had a positive effect on color psychology and utilization. In addition, overall, the color mind expression program was effective in positive and psychological recovery of negative emotions, such as being able to honestly express the difficulties felt in the process of preparing for employment.

Key Words : color mind, emotion, psychological mindedness, understanding of others, University students

요 약 색채가 인간에게 미치는 영향은 교육 이외에도 인간의 정서, 행동, 신체 간의 관계 등 다양한 영역에서 연구가 이루어져 왔다. 이 연구는 대학생의 색채표현을 관찰하여 대학생의 내면과 성향을 이해하고, 색채표현활동이 심리표출과 자아표현, 감정 해소의 수단이 될 수 있다고 가정하여, 색채마음표현 프로그램이 대학생의 심리적 마음상태에 미치는 효과를 찾고자 하는 것이 목적이다. 연구결과 색채마음표현 프로그램이 대학생의 내면 감정과 정서 표현에 영향을 미쳤으며, 색채심리와 활용에 긍정적 영향을 미쳤다. 또한 취업준비 등의 과정에서 느끼는 어려움을 솔직하게 표현할 수 있는 등 전반적으로 색채마음표현 프로그램이 부정적 정서에 긍정적 및 심리적 회복에 효과적으로 나타났다.

키워드 : 색채, 감정, 심리적 사고, 타인에 대한 이해, 대학생

1. Introduction

The effects of colors on man have been explored in many disciplines including education. Historically,

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the healing power of colors has been drawing much attention from doctors and alchemists in ancient Greece and Egypt to counselors and companies in modern times, whilst researchers have delved into the relationship between colors and human emotion, behavior and body[1].

The techniques of applying colors to psychotherapy assume the effects of colors on human emotion and physiology[2]. Colors affect humans when they visually perceive colors, and when they engage in activities of color expression using their sensory organs.

Previous research [3] reported that people's choice of colors varies with their emotional states. For example, those with high emotional adaptability responded openly to colors, whereas the emotionally restricted people averted colors as much as possible while interacting with colors. Another study [4] found that the expression activities in fine arts revealed human emotion and sentiment, and that the expression of not only concrete images reflecting their reality but also abstract images comprising lines, shapes and colors had therapeutic effects.

Colors have power. Colors may stimulate or soothe people[5]. In addition, colors invoke excitement or relief, hot or cold feelings, sorrow or joy, and passion, or raise their mentality[6]. The effects of the color expression activities apply to ordinary people. The colors represented in pictures deliver their sentiments or psychological states, and thus give clues for understanding their sentiments. Likewise, encouraging undergraduates to express their sentiments with colors and observing them will help understand their inner world and inclination, while at the same time the color expression activities will serve as a means of expressing psychology and self as well as reliving emotions in favor of undergraduates.

For the purpose of this study, the following question was raised.

Study question : How will the 'Express Your Mind with Colors' program affect undergraduates' psychological mindedness?

2. Background Theory

2.1 Color Mind Expression Program

Four specialists related to University students, including a doctoral degree major in educational engineering, a color psychologist, and two teachers, developed a color mind expression program of improving psychological state of mind based on color psychology. The goals set for this are as follows: First, students are aware of their own psychological and emotional feelings, express themselves naturally, have a strong ability to recognize the state of mind of others, and to overcome their high perception and anxieties about their thoughts, feelings, and actions. Second, the program improves understanding of emotion, understanding of others, and understanding of behavior.

2.2. Psychological state of mind

Psychological state of mind is defined as a tendency to explore emotionally and intellectually how and why and how others feel and act. McCallum and Piper (2000) define the psychological state of mind as a general skill that allows individuals to think about internal processes or external events. Kim, Mi-kyung (2010) presumes that the technique of applying color to psychotherapy also affects human emotion and physiology.

3. Materials and Methods

3.1. 'Express Your Mind with Colors' Program

Four experts, i.e one doctor of educational

technology, one color psychotherapist and two incumbent teachers, developed the 'Express Your Mind with Colors' program based on color psychology with intent to help undergraduates improve their psychological mindedness.

'Express Your Mind with Colors' program was intended to improve undergraduates' psychological mindedness with specific goals defined as follows. First, it helps undergraduates perceive and naturally express their psychological states and emotions, perceive others' state of mind, become conscious of their personal thoughts, emotions and behaviors and have a strong capacity to overcome their worries. Second, it improves undergraduates' understanding of emotions, others and behaviors.

It was assumed that the color mind expression program had a direct effect on the psychological mind state of University students, and the demographic characteristics were assumed to affect the color mind expression program and the psychological mind state of University students.
The research model (Table 1) constructed through literature review and prior research is as follows.

Table 1. Research Model

color mind expression program		psychological mind state
open mind self-awareness self-understanding self-healing self-growth	⇛	problem consultation self change understanding emotions understanding others understanding behavior

3.1.1. Orientation of the program

The proposed program is oriented toward making students feel their own colors confined in their minds via colors presented and thus helping them to feel colors with their own emotions instead of understanding the colors with some acquired objective knowledge. In addition, the program aims to guide students to develop their own unique semantics of colors, enable them to use colors both agreeable and disagreeable to them in diverse ways, and embed diverse feelings and emotions about colors in them.

In color-expression learning, students are encouraged not to understand and accept objective feelings of colors but to identify their own emotions and feelings lying in their memories and minds via colors. That is, the color-expression learning is basically an expression learning emphasizing the internal process toward valuing the color-related feelings and emotions while encouraging students to feel and express the colors on their own.

3.1.2. Specifics of the program

The 'Express Your Mind with Colors' program consists of 10 sessions: 2 sessions on mind opening, 2 sessions on self-awareness, 2 on self-understanding, 2 on self-healing, and 2 on self-growth.

In the mind opening sessions (1st and 2nd), students are asked to recall the colors impressed on their memories, create a color history about the color, and add watercolors to the water in a glass to express the color discovered in the color history. In the 3rd and 4th sessions on self-awareness, students are asked to bring back the memories of their favorite colors, create a color history about the color, and add watercolors to the water in a glass under the theme of 'a party of my favorite colors'.

In the 5th and 6th sessions on self-understanding, students are asked to create a family-related color history, assign a color to each family member, and add watercolors to the water in a glass. In the 7th and 8th sessions on self-healing, students are asked to bring back their memories of the colors they dislike, create a color history about the color, and add watercolors to the water in a

glass under the theme of 'an outcry of disagreeable colors'.

In the 9th and 10th sessions on self-growth, students are asked to cast back to their memories of nature, create a color history, and add a watercolor that comes to remembrance to the water in a glass. They can adjust the amount and structure of water in the glass to create the color and image of the nature.

3.2. Psychological mindedness

The psychological mindedness is defined as an inclination to emotionally and intelligently explore the ways and reasons that others behave, think and feel. Conte et al. (1996) defined psychological mindedness as the extent to which one accesses his/her own emotion, one's willingness to make efforts to understand himself/herself or others, and one's trait assuming the beliefs in the advantage of discussing one's own problems and the interest in the meaning and motivation of behaviors and the acceptance of one's own and others' thoughts, emotions and changes[7].

Grant referred to the psychological mindedness as a process of explaining or understanding one's own and others' behaviors[8]. McCallum and Piper et al. defined the psychological mindedness as a general skill that enables individuals to contemplate on their internal process or external events[9].

3.3. Subjects

The population selected for this study was senior students attending a university. For the convenience of data collection, a convenience sample was extracted from the senior students at 2 universities in 2 small and medium-sized cities. Considering the representativeness of different majors of the subjects at the two universities, data was collected from 250 students (more than 100 students at each university). Finally, a convenience sample of 150 students was included in the study.

3.4. Instruments

The questionnaire used in Shill & Lumley(2002)[10] was adapted for the purpose and subjects of this study. The subtypes of psychological mindedness used in this study are composed of 45 question items involving consultation of problems, empathy, understanding of others, behavioral understanding and self-change. Each item was rated on a 5-point Likert scale, where 1 and 5 meant Strongly Disagree and Strongly Agree, respectively.

The higher the score, the greater the psychological mindedness. The overall Cronbach of the measure was .75, whilst the Cronbach s of the problem consultation, empathy, understanding of others, behavioral understanding and self-change were .65, .63, .67, .68, and .69, respectively, all of which indicated a good internal consistency.

3.5. Data analysis

The collected pre- and post-test data were analyzed with SPSS WIN 22.0. First, the pre- and post-test averages and standard deviations as well as the adjusted post-test average and standard error of the experimental and comparison groups were analyzed. Second, to control over the pre-test scores, the pre-test scores were set as the covariates in the ANCOVA.

4. Results and Discussion

4.1. Experimental treatment

To ensure the length of time for the experiment, the validity of the instruments and the adequacy of the experimental specifics and procedure prior to

embarking upon the experiment, 2 authors conducted a preliminary experiment with 19 undergraduates, who were not participants in the study. The preliminary experiment demonstrated the program would fit undergraduates in that the subjects actively joined the activities of expressing their minds with colors and showed continuous interest and attention.

As shown in (Table 2), in terms of the overall psychological mindedness, problem consultation, empathy, understanding of others, behavioral understanding and self-change, the variance in the experimental group between the pre-test and post-test scores was greater than that in the comparison group. This result suggests the 'Express Your Mind with Colors' program was

Table 2. Inter-group pre-test vs post-test averages and standard deviations in undergraduates' psychological mindedness

Division	Pretest				Posttest				Adjusted Posttest			
	comparison group		comparative group		comparison group		comparative group		comparison group		comparative group	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Total	3.55	.41	3.64	.42	4.07	.69	3.73	.42	4.11	.10	3.70	.10
problem consultation	3.72	.42	3.77	.49	4.14	.61	4.01	.22	4.14	.09	4.01	.09
self change	3.19	.50	3.42	.39	3.90	.68	3.42	.58	3.94	.12	3.38	.12
understanding emotions	3.60	.56	3.56	.54	4.13	.87	3.63	.63	4.11	.12	3.65	.11
understanding others	3.66	.57	3.79	.56	4.13	.81	4.04	.62	4.17	.12	4.00	.12
understanding behavior	1.44	.39	1.11	.17	2.23	.85	1.06	.15	2.18	.13	1.11	.12

The experiment was conducted for 10 weeks from June 8th, 2018. A total of 10 experimental treatment sessions were offered twice a week with each session lasting for 90 minutes. For the duration of the experiment, the authors administered the 'Express Your Mind with Colors' program to the experimental group, whereas the control group participated in ordinary activities.

4.2. Results

4.2.1. Inter-group differences in pre- and post-test averages and standard deviations

The effects of the 'Express Your Mind with Colors' program on undergraduates' psychological mindedness were analyzed as follows. (Table 2)> shows the pre-test and post-test averages and standard deviations as well as the adjusted post-test averages and standard errors in the psychological mindedness of the experimental and comparison groups.

effective for the undergraduate subjects' overall psychological mindedness.

4.2.2. ANCOVA of undergraduates' psychological mindedness scores in two groups

To determine the differences between experimental and comparison groups in their psychological mindedness scores, the pre-test scores were set as the co-variates for the analysis of covariance. As shown in (Table 3), the ANCOVA with the pre-test controlled over, indicated significant differences between the experimental and comparison groups as follows: overall psychological mindedness score($F=8.23$, $p<.01$), self-change ($F=16.49$, $p<.01$), emotional understanding($F=7.46$, $p<.01$) and behavioral understanding($F=32.55$, $p<.001$).

The foregoing results are consistent with a previous report [11] that color(light) environment had positive effects on relieving psychological and physical stress, and another previous study[12] that

illuminated the relationship between undergraduates' color preference and expression and their optimism.

4.3. Discussion

The proposed 'Express Your Mind with Colors' program is not intended to understand, accept and express the objective feelings of colors. Instead, it is designed to help students to identify their own unique feelings and emotions about colors vividly alive in their memories and experiences, feel colors with their own feelings and emotions, and express such feelings in easy and interesting ways.

representing the colors arising in their memories in detail. The proposed 'Express Your Mind with Colors' program highlighted the following results.

First, the program triggered undergraduates' interest in colors and their memories of their personal experiences of colors, so as to they can perceive colors with their own unique feelings and emotions.

Second, the program was very conducive to undergraduates' color-oriented expressions with fun and confidence using colors conveying their own genuine stories and feelings.

Table 3. ANCOVA of undergraduates' psychological mindedness scores in two groups

Source		Sum of squares	df	Mean square	F
Total	Covariate	3.09	1	3.09	11.49**
	Betweengroup	2.21	1	2.21	8.23**
	Error	13.98	52	.27	
	Total	855.87	55		
problem consultation	Covariate	.46	1	.46	2.26
	Betweengroup	.25	1	.25	1.25
	Error	10.50	52	.20	
	Total	923.47	55		
self change	Covariate	1.24	1	1.24	3.34
	Betweengroup	4.06	1	4.06	16.49**
	Error	19.32	52	.37	
	Total	757.42	55		
understanding emotions	Covariate	9.95	1	9.95	25.39***
	Betweengroup	2.92	1	2.92	7.46**
	Error	20.37	52	.39	
	Total	859.67	55		
understanding others	Covariate	6.76	1	6.76	16.99***
	Betweengroup	.40	1	.40	1.00
	Error	20.70	52	.40	
	Total	946.21	55		
understanding behavior	Covariate	.41	1	.41	1.12
	Betweengroup	11.92	1	11.92	32.55***
	Error	19.03	52	.37	
	Total	185.50	55		

** p< .01, *** p< .001

To that end, we formulated the 10-session program with 2 mind-opening sessions, 2 self-awareness sessions, 2 self-understanding sessions, 2 self-healing sessions, and 2 self-growth sessions. In each session, we encouraged students to express their minds by precisely naming and

Third, the program excited undergraduates' interest in and attention to colors, and guided them to break away from vague objective ideas about colors, to retrieve their vivid feelings from their experiences and minds, and to realize that their feelings hold the value of beauty.

Finally, the proposed instructional plan of using colors to express one's mind provided undergraduates with adequate methods of expression with ease and fun, enabled them to savor a sense of achievement and the joy of expression with colors, and suggested that color expression approaches should embrace diverse methods that any student can try with ease and fun.

5. Conclusion

We administered the proposed 'Express Your Mind with Colors' program to undergraduate subjects to determine the effects of their psychological mindedness and its sub-factors on their problem consultation, self-change, emotional understanding of others and behavioral understanding.

Based on literature review on the effects of mindedness and color psychotherapy, we developed the 10-session 'Express Your Mind with Colors' program. The experimental group of undergraduates participated in the program twice weekly for 90 minutes per session. The proposed 'Express Your Mind with Colors' program supported the following grounds for discussion.

First, the 'Express Your Mind with Colors' program had positive effects on undergraduates' psychological mindedness. Specifically, the program helped undergraduates to express their internal emotions and sentiments and achieve body-mind balance and harmony, and exerted effects on their overall psychological mindedness.

Second, drawing on color psychology and colors in the study with undergraduate subjects helped understand their deep psychological sentiments and effectively improved self-expression skills, whilst the mind expression with colors and resultant self-change, emotional understanding and behavioral understanding had positive effects on the undergraduates.

Third, the program facilitated the undergraduate subjects' sharing of their difficulties of psychological mindedness as job seekers, and had positive effects on their self-change, emotional understanding and behavioral understanding. Emotionally stable and positive people can cope with and control stress relatively easily when the psychological mindedness is relieved. Therefore, continuous attention and specialized measures are needed to help undergraduates as future job seekers with their difficulties of psychological mindedness and other problems.

The findings of this study based on the proposed 'Express Your Mind with Colors' program suggested that undergraduates' experience of diverse colors had positive effects on their coping with negative sentiments and problem behavior, and was effective for their emotional stability and psychological recovery.

Also, the 'Express Your Mind with Colors' program empowered the undergraduates with diverse media to understand and share their own and others' thoughts and feelings, to control themselves in consideration of others, and to engage in positive, cooperative, caring and empathic interactions, which influenced their overall psychological mindedness.

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